

## WHAT IS CLAIMED IS:

1. A filter for a valve, the valve including a bore for receiving the filter and an orifice for accommodating a fluid flow therethrough, the filter comprising:

an entrance head, the entrance head configured to be in predetermined spaced relationship with the bore of the valve when disposed therein to define a filter entrance, the filter entrance being sized to prevent particles of a predetermined size from entering the filter entrance; and

a body portion cooperating with the bore to define a fluid passage, the fluid passage having an exit port which is communicable with the orifice.

2. The filter according to claim 1 wherein the body portion includes a relief element for defining the fluid passage.

3. The filter according to claim 1 wherein the body portion includes a section that is generally polygonal and includes a plurality of rounded corners.

4. The filter according to claim 3 wherein the rounded corners each have a radius that substantially conforms to a radius of the bore of the valve.

5. The filter according to claim 1 wherein the body portion includes a seal ring.

6. The filter according to claim 1 wherein the body portion includes a first section at least a portion of which is smaller than the entrance head to define the fluid passage.

7. The filter according to claim 6 wherein the body portion includes a second section adjacent to the first section, the second section being smaller than the first section to define a step therebetween.

8. The filter according to claim 1 wherein the exit port is disposed in the body portion.

9. The filter according to claim 8 wherein the body portion includes a hole in communication with the exit port.

10. The filter according to claim 1 further comprising:  
a mounting flange.

11. The filter according to claim 1 wherein the body portion includes a cylindrical section disposed in opposing relationship to the entrance head, at least a portion of the cylindrical section being deformable such that the portion has a flared shape.

12. The filter according to claim 1 wherein the body portion defines the orifice.

13. A valve comprising:

an input port for connection to a pressure source to develop a fluid flow;

a bore in communication with the input port;

an orifice for accommodating the fluid flow therethrough, the orifice disposed in the bore; and

a filter disposed in the bore, the filter including an entrance head and a body portion, the entrance head in predetermined spaced relationship with the bore of the valve to define a filter entrance, the filter entrance being sized to prevent particles of a predetermined size in the fluid flow from entering the filter entrance, the body portion cooperating with the bore to define a fluid passage, and the fluid passage having an exit port which is communicable with the orifice.

14. The valve according to claim 13 further comprising:

a spool, the spool defining the bore and including an end face;

wherein the filter is disposed in the bore such that a portion of the entrance head projects beyond the end face of the spool to define an offset portion of the filter.

15. The valve according to claim 14 further comprising:

a cage, the cage defining a discharge port;

wherein the spool is movable to selectively open and close the discharge port, the discharge port when open being in communication with the input port to accommodate a discharge fluid flow, the discharge fluid flow interacting with the offset portion of the filter to develop a pressure gradient such that any particles trapped in the filter entrance are urged to move into the discharge fluid flow out of the valve through the discharge port.

16. The valve according to claim 13 wherein the valve comprises a two-stage valve.

17. The valve according to claim 16 further comprising:

a retainer;

an actuator assembly including an actuator tube, a coil assembly, a pole piece, and an armature, the retainer mounted to the actuator tube, the actuator tube having a bore, the coil assembly mounted to the actuator tube, the pole piece retained within the bore of the actuator tube, and the armature movably disposed within the bore of the actuator tube, the armature including a rigid member;

a first housing, the first housing having a bore;

a poppet movably disposed within the bore of the first housing, the poppet in contacting relationship with the rigid member of the armature, the poppet having a head with a tip;

a passageway, the poppet being movable such that the tip of the poppet can be seated in the passageway;

a second housing having a bore;

a spool being movably disposed within the bore of the second housing.

18. The valve according to claim 14 wherein the orifice is disposed in an orifice insert, the orifice insert being disposed within the spool.

19. The valve according to claim 13 wherein the body portion of the filter includes a relief element for defining the fluid passage.

20. The valve according to claim 13 wherein the body portion of the filter includes a section that is generally polygonal and includes a plurality of rounded corners, the rounded corners each having a radius that substantially conforms to a radius of the bore, the rounded corners in contacting relationship with the bore.

21. The valve according to claim 13 wherein the body portion of the filter includes a seal ring disposed in sealing engagement with the bore.

22. The valve according to claim 13 wherein the body portion of the filter includes a first section at least a portion of which is smaller than the entrance head to define the fluid passage.

23. The valve according to claim 22 wherein the body portion of the filter includes a second section adjacent to the first section, the second section being smaller than the first section to define a step therebetween.

24. The valve according to claim 13 wherein the exit port is disposed in the body portion of the filter, and the body portion includes a hole in communication with the exit port.

25. The valve according to claim 18 wherein the filter includes a mounting flange, the spool includes a shoulder, the mounting flange being disposed between the orifice insert and the shoulder of the spool to retain the filter.

26. The filter according to claim 14 wherein the body portion includes a flared part disposed in opposing relationship to the entrance head and a step, the spool includes a tapered bore surface and a shoulder, the flared part substantially conforming to the tapered bore surface, the flared part and the shoulder of the filter cooperating with the tapered bore surface and the shoulder of the spool, respectively, to retain the filter.

27. The valve according to claim 13 wherein the body portion of the filter defines the orifice.

28. A self-cleaning filter for a valve, the valve including a bore for receiving the filter and an orifice for accommodating a first fluid flow therethrough, the filter comprising:

an entrance head, the entrance head configured to be in predetermined spaced relationship with the bore of the valve when disposed therein to define a filter entrance, the filter entrance being sized to prevent particles of a predetermined size from entering the filter entrance, the entrance head being configured to project beyond an end of the bore to define an offset portion of the entrance head; and

a body portion cooperating with the bore to define a fluid passage, the fluid passage having an exit port which is communicable with the orifice;

wherein when a second fluid flow, which moves in a direction different than the first fluid flow, acts upon the offset portion, a pressure gradient develops such that any particles trapped in the filter entrance are urged to move out of the filter entrance into the second fluid flow.